NATURAL RESOURCES CONSERVATION SERVICE

CONSTRUCTION SPECIFICATION

823B - EARTHFILL

1. SCOPE

The work shall consist of construction of earth embankments and other earthfills as shown on the drawings.

Prior to commencing construction, public utilities shall be notified in accordance with N.Y.S. Industrial Code 753.

2. MATERIALS

All fill materials shall be obtained from required excavations and designated borrow areas. The selection, blending, routing and disposition of materials in the various fills shall be subject to approval by the approving official or designated representative.

Fill materials shall contain no sod, brush, roots or other perishable materials. The maximum rock particles incorporated in the fill shall be 6 inches, except that the maximum size of rock particles in the backfill material within 2 feet of a structure shall be 3 inches. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compaction of the fill.

3. FOUNDATION PREPARATION

A. General

The earthfill foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the earthfill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earthfill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.

Foundation and abutment surfaces shall not be steeper than 1 horizontal to 1 vertical unless otherwise specified. Test pits or other cavities in the foundation shall be filled with compacted earthfill conforming to the specifications for the earthfill to be placed upon the foundation.

B. Additional Requirements For Manure or Liquid Containment

The excavated area will be constructed according to the lines and grades as shown on the drawing.

Unless otherwise specified in Section 13, the bottom and excavated areas of the earthen facility shall be compacted as specified in Section 7, Class C Compaction. If porous lenses are encountered, they shall be overexcavated to a minimum depth of 12 inches below grade and if seepage is encountered, a suitable drainage system shall be installed as directed or approved by the approving official.

Liners, if specified, shall conform to the appropriate NRCS construction and materials specifications as follows:

Construction Specification 97	HDPE and LLDPE Liner
Material Specification 594	HDPE and LLDPE Flexible Membrane Liner
Construction Specification 98	Geosynthetic Clay Liner
Material Specification 595	Geosynthetic Clay Liner

4. CORE TRENCH

Where specified, a core trench shall be excavated along or parallel to the central axis of the earth fill as shown on the plans. The width of the trench shall be governed by the equipment used for excavation and backfilling, with the minimum width being 4 feet.

If a core trench is needed, the minimum depth below the subgrade shall be 2 feet or the depth shown on the plans. If large boulders or bedrock is encountered in the excavation, the minimum depth will not be required if, in the opinion of the approving official or designated representative, the trench cannot be excavated to the required depth. The rock or boulders shall be cleared of all materials to insure adequate compaction of backfill material to the rock. The side slopes of the trench shall be 1H:1V or flatter.

The backfill material for the core trench shall be the most impervious material available and shall be compacted as specified in Section 13. The fill material shall contain sufficient moisture to insure adequate compaction of the soil.

5. PLACEMENT

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the project designer or designated representative. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

Fill shall be placed in approximately horizontal layers. Compaction method shall be as specified in Section 13.

Adjacent to structures, fill shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.

Unless otherwise authorized, the embankments shall be constructed in continuous horizontal layers. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross slope of not less than 2% shall be

maintained for positive drainage.

6. CONTROL OF MOISTURE CONTENT

Unless otherwise specified on the construction drawings or in Section 13 of this specification, the following paragraphs apply to control of moisture content.

During placement and compaction of fill, the moisture content of the materials being placed shall be maintained within the limits required to permit satisfactory compaction at sufficient moisture content. If fill material is placed containing a moisture content to produce a hand molded ball which holds its shape and one is unable to squeeze or shake free water to the surface, the moisture content can normally be considered satisfactory and sufficient.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement on the fill, if necessary. Uniform moisture distribution shall be obtained by disking, blading, or other approved methods prior to compaction of the layer.

Material that is too wet when deposited on the fill shall either be removed or be dried to the acceptable moisture content prior to compaction.

If the top surface of a preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond it shall be scarified and moistened by sprinkling to an acceptable moisture content prior to placement of the next layer of fill.

7. COMPACTION

Earthfill shall be compacted according to the following requirements for the class of compaction specified:

Class A Compaction
Each layer of fill shall be compacted as necessary to make the density of the fill matrix not less than the minimum density specified. Such densities shall be determined by testing method as outlined in Section 9. The fill matrix is defined as the portion of the fill material finer than the maximum particle size used in the compaction test method specified.

Class C Compaction
Unless otherwise specified in Section 13, each layer of fill shall be compacted by a minimum of 4 passes of the compaction equipment specified below, or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel, track or drum over the entire surface of the layer. General requirements for compaction equipment are as follows:

a) For cohesive soils, a sheepsfoot roller having a minimum static weight of 10,000 lbs. shall be used.
b) For cohesionless soils, a vibratory smooth-drum roller having a minimum static weight of 10,000 lbs. shall be used.

c) If allowed in Section 13, construction equipment may be routed for compaction. However, the maximum layer thickness shall be 6 inches.

Compaction Adjacent to Structures or Conduits

Unless otherwise specified in Section 13, compaction of fill adjacent to structures shall be accomplished by means of manually directed power tampers or rollers, except that hand compaction may be used in bedding of pipes and in sections inaccessible to the manually directed power tampers. Heavy equipment, including self-propelled rollers shall not be operated within 3 feet of any structure.

The passage of heavy equipment will not be allowed over any type of conduit until the backfill has been placed above the top surface of conduit to a height equal to one-half of the clear span width of the conduit or 2 feet, whichever is greater.

Compaction of fill adjacent to concrete structures shall not be started until the following time intervals have elapsed after placement of the concrete:

Structure or Conduit	Time Interval
Retaining walls and counterforts	14 days
Walls backfilled on both sides simultaneously	7 days
Conduit, precast, cradled	2 days
Conduits, precast, bedded	1 day
Anti-seep collars and outlet bents	3 days

8. REMOVAL AND REPLACEMENT OF DEFECTIVE FILL

Fill placed at moisture contents outside the acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or be removed and replaced by acceptable fill. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control, and compaction.

9. TESTING

Densities of fill requiring Class A compaction will be determined by a qualified testing facility hired by the contractor in accordance with ASTM Method D 698 (Laboratory Compaction Characteristics Of Soil Using Standard Effort), D 1556 (Standard Test Method For Density And Unit Weight Of Soil In Place By The Sand Cone Method), D 1557 (Laboratory Compaction Characteristics Of Soil Using Modified Effort), D 2167 (Standard Test Method For Density And Unit Weight Of Soil In Place By The Rubber Balloon Method), D 2922 (Standard Test Method For Density Of Soil And Soil Aggregate In Place By Nuclear Method (Shallow Depth)), or D 2937 (Standard Test Method For Density Of Soil In Place By The Drive-Cylinder Method). The density so computed will be used to determine the percent compaction of the fill matrix. Unless otherwise specified, moisture content will be determined by one of the following methods: ASTM Method D 2216 (Standard Test Method For Laboratory Determination Of Water (Moisture) Content Of Soil And Rock), or D 3017 (Standard Test Method For Moisture Content Of Soil And Soil Aggregate In Place By Nuclear Method (Shallow Depth)).

Densities of fill requiring Class C compaction may be tested during the course of the work by the approving official or designated representative in accordance with ASTM Method D 698, D 1556, D 1597, or D 2167. Moisture content may be determined by ASTM

Method D 2216. Such tests are not intended to provide the contractor with information required by him for the proper execution of the work and their performance shall not relieve the contractor of the necessity to perform tests for that purpose.

10. FINAL GRADING

Final grading shall provide the required backfill, compaction, positive surface drainage, removal of rocks over 4 inches and placement of topsoil. All disturbed areas shall be permanently vegetated as specified in Construction Specification Seeding, 806.

11. EROSION AND SEDIMENT CONTROL

Install erosion and sediment control plan as shown on the drawings.

12. MEASUREMENT AND PAYMENT

Method 1

For items of work for which specific unit prices are established in the contract, the volume of each type of earthfill within the specified zone boundaries will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Unless otherwise specified, no deduction in volume will be made for embedded conduits and appurtenances. *The pay limits will be the measured surface of the foundation when approved for placement of the fill and the specified neat line of the fill surface. Fill required to fill voids resulting from over excavation of the foundation, outside the specified lines and grades, will be included in the measurement for payment only where such over excavation is directed by the project designer to remove unsuitable material and where the unsuitable condition is not a result of the contractor's improper construction operations, as determined by the project designer.* Payment for each type of fill will be made at the contract unit price. Such payment will constitute full compensation for all labor, materials, equipment, tools, and other appurtenances necessary and incidental to the completion of the work.

Method 2

For items of work for which specific lump sum prices are established in the contract, the quantity of each type of fill will not be measured. Payment for each type of fill will be made at the contract lump sum price. Such payment will constitute full compensation for all labor, materials, equipment, tools, and other items necessary and incidental to the completion of the work.

Compensation of any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 13.

13. ITEMS OF WORK AND ADDITIONAL CONDITIONS: